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(54) **A fibre preparatory machine, in particular a carding or blowroom machine**

(57) The machine has a cylinder with a fibre processing clothing (1) and at least one dust and trash extraction unit with a mote knife (3) which is perpendicular to the cylinder's surface speed direction (2). The mote knife (3) is pivotally mounted to a support (11) for pivoting about an axis (13) which is situated in front of the front edge (12) of the mote knife (3) such that when the front edge (12) is pushed by a contamination, it swings in the cylinder's speed direction (2) and away from the clothing (1). The mote knife (3) is elastically preloaded against a stop.

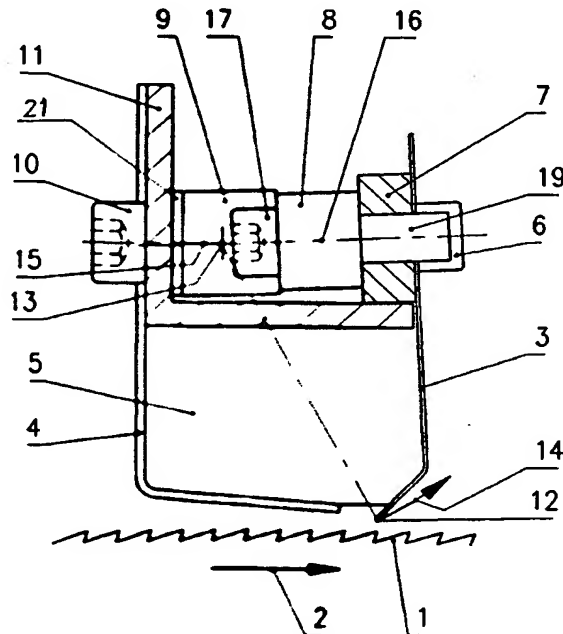


Fig. 1

EP 1 033 424 A1

Description

Field and background of the invention

[0001] The present invention relates to fibre preparatory machines like carding or blowroom machines, comprising cylinders and stationary flats with a minimum of one dust and trash extracting unit. In the unprocessed fibre material, several kind of contamination, fibre accumulations, thick places and such are quite common and must be removed by the preparatory machines. It is one of the principle tasks of the preparatory machines to eject and/or open up such irregularities.

[0002] Mote knives are used in stationary elements for the removal of dust, trash and short fibres. The mote knife is placed perpendicular and opposite to the cylinder's surface speed direction. In order to capture all types and sizes of irregularities, the distance between the working elements of cylinder and adjacent mote knife must be kept small and constant with time. A typical setting is 0.2 - 0.3 millimetres distance.

[0003] The US patent no. 5,031,278 shows for example such a device with mote knives. The distance between the mote knife's edge and the clothing of the cylinder can be adjusted. But the mote knife itself is sturdy and of rigid design. The knife is rigidly fixed to the supporting elements.

[0004] It has been noticed that the elements of the entire mote knife system must be extremely sturdy, otherwise the system will be bent and damaged during operation. The reason for this damage can be traced to contamination and fibre bundles which are carried along by the clothing of the cylinder and are passing the mote knife. As the distance of a mote knife to the clothing is normally around 0.3 millimetres, it needs only relative small particles to be squeezed between those close elements. The surface speed of a standard card is around 30 meters per second, which equals 100 kilometres per hour. One might imagine that the sudden impact of a particle, held by the clothing's teeth, to the rigid mote knife induces great forces on the entire system. One of the three engaged elements, the clothing's teeth, the mote knife or the particle, must give in within milliseconds. Contaminating particles in the processed fibre mass are often of considerable hardness and thus are not easy to crack within milliseconds. Therefore, either the mote knife or the clothing are damaged.

[0005] A proposal for such a sturdy design is shown for example in EP 0 336 222.

[0006] For the mote knife it might be a partial solution to enforce the system, but not so for the cylinder's clothing. In any case, the machine's elements will suffer, might break or show excessive wear and tear. Even the mote knife's sharp edges will show burrs and other signs of wear and tear. From this, one might readily deduce that the efficiency of the preparatory machine will suffer in an undesired manner.

[0007] EP 0 195 756 shows an elastic attachment of a stationary flat for cards. The main purpose of the explained design is an elastic displacement of the flat in radial direction. The flat is substantially rigidly attached in tangential direction. A design like this will not solve the problem of impacts as the forces are primarily in tangential direction as the main cylinder surface rotates.

Summary of the invention

[0008] According to the invention, the mote knife is flexibly mounted instead of rigidly attached in a way which allows it at the same time to be displaced in tangential and in radial direction. Thus giving way for any particle which gives impact to the knife. This avoids the above described drawbacks of the conventional mote knives. The invented mote knife leads to a lightweight, cheap design and allows for close settings to the cylinder's clothing. A mote knife according to the invention avoids excessive forces on the system in case a contamination is passing, thus the useful life time of the mote knife itself and the adjacent clothing is extended. A mote knife according to the invention allows for close settings, thus giving high extraction of contamination and thus high carding and cleaning quality.

Brief description of the drawings

[0009] The invention is explained by examples in the following schematic drawings. These show:

- Fig. 1 a side view of the mote knife in standard operation,
- Fig. 2 a top view of the mote knife's elastic support, and
- Fig. 3 a side view of the mote knife when a contamination is passing.

Detailed description of the preferred embodiment

[0010] Fig. 1 shows a side view and partial cross section of the main elements. The cylinder clothing 1 is rotating in direction 2. Adjacent to the cylinder clothing 1, a mote knife 3 is placed at a distance of approximately 0.3 millimetres. The mote knife 3 might be one piece stretching over the entire width of the cylinder or it might be divided into several segments of shorter lengths. A holding section 4 guides fibres into the clothing 1 while small particles like dust, trash and short fibres are kept free in the fast circulating air stream. The distance of the holding section 4 to the cylinder clothing 1 is approximately 0.5 millimetres, somewhat larger than the distance of the mote knife 3. These settings effectively separate the air stream together with the small particles and guide them into a suction channel 5. The mote knife 3 is attached with screws 6 to a bar 7. The bar 7 is positioned by at least one elastic element 9 through a distance holder 8. The elastic element 9 is

attached with a screw 10 to the basic support 11 of the entire mote knife system. Screws 17 fix the distance holder 8 to the bar 7. Seen in the direction 2 of the cylinder clothing movement, the elastic element 9 is positioned in front of the edge 12 of the mote knife 3.

[0011] The elastic element 9 consists of a rubber or elastomer block which, in the unmounted position, has parallel end faces. One of the end faces is vulcanised to a steel plate 21 which has a female thread into which the screw 10 is screwed. The other face is vulcanised to the distance holder 8. In the mounted position shown in Fig. 1, the elastic element 9 is elastically deformed such that the bar 7 is preloaded against the basic support 11. This is shown by the inclination of the axes 16 of the screws 17 against the axis 15 of the screw 10. The elastically preloaded abutment of the bar 7 against the basic support 11 seals the suction channel 5 off.

[0012] The chosen geometry results in the following advantageous movement of the mote knife 3: When pushed away, the mote knife 3 swings around an axis 13 inside the elastic element 9 as indicated by the arrow 14. The edge 12 therefore moves in a combined way in direction of the cylinder's clothing movement 2 and in direction away from the cylinder clothing 1.

[0013] Fig. 1 shows one of two centring pins 19 which are held by the bar 7 and engage bores in the mote knife 3 as means to position the mote knife 3 in place. Screws 6 fix said mote knife 3 to the bar 7. When disassembling the screws 6, the mote knife 3 can easily be replaced and no readjustment of the system is necessary.

[0014] Fig. 2 shows a top view of the mote knife's elastic support. The basic support 11 holds the elastic element 9 through screws 10. Fixed by screws 17 to this elastic element 9 is a distance holder 8, which keeps the mote knife 3 in place through screws 6.

[0015] Fig. 3 shows the action of the flexible support in case a contamination is passing the mote knife. The situation is close to Fig. 1 but a contamination 18 is carried along by the cylinder clothing 1 and pushed against the front edge 12 of the mote knife 3. The mote knife 3 rotates around the swing axis 13 and thus opens up the gap between the cylinder clothing 1 and the front edge 12. The position of the swing axis 13 in front of the front edge 12 allows for this upward movement of the front edge 12, whenever said front edge is pushed backward by a contamination 18.

is situated in front of a front edge (12) of the mote knife (3) such that when the front edge (12) is pushed by a contamination (18) it swings in the cylinder's speed direction (2) and away from the clothing (1).

2. The machine according to claim 1, further comprising an elastic element (9), the centre of which defining the pivoting axis (13).
3. The machine according to claim 2, wherein the centre of said elastic element (9) is placed more than 5 millimetres in front of the front edge (12) of said mote knife (3).
4. The machine according to claim 2 or 3, wherein said elastic element (9) is made of rubber or an elastomer material.
5. The machine according to one of claims 1 to 4, wherein said mote knife (3) is fixed and positioned by centring pins (9) on a bar (7) which allows for easy replacement of the mote knife (3) without readjustment of the system.
6. The machine according to one of claims 1 to 5, wherein said mote knife (3) is divided into several sections of shorter lengths than the width of the cylinder.
7. The machine according to one of claims 1 to 6, wherein the mote knife (3) is elastically preloaded against a stop.

Claims

1. A fibre preparatory machine, in particular a carding or blowroom machine, with at least one cylinder with a fibre processing clothing (1) and stationary flats with at least one dust and trash extracting unit with at least one mote knife (3) placed perpendicular to the cylinder's surface speed direction (2), wherein said mote knife (3) is pivotally mounted to a support (11) for pivoting about an axis (13) which

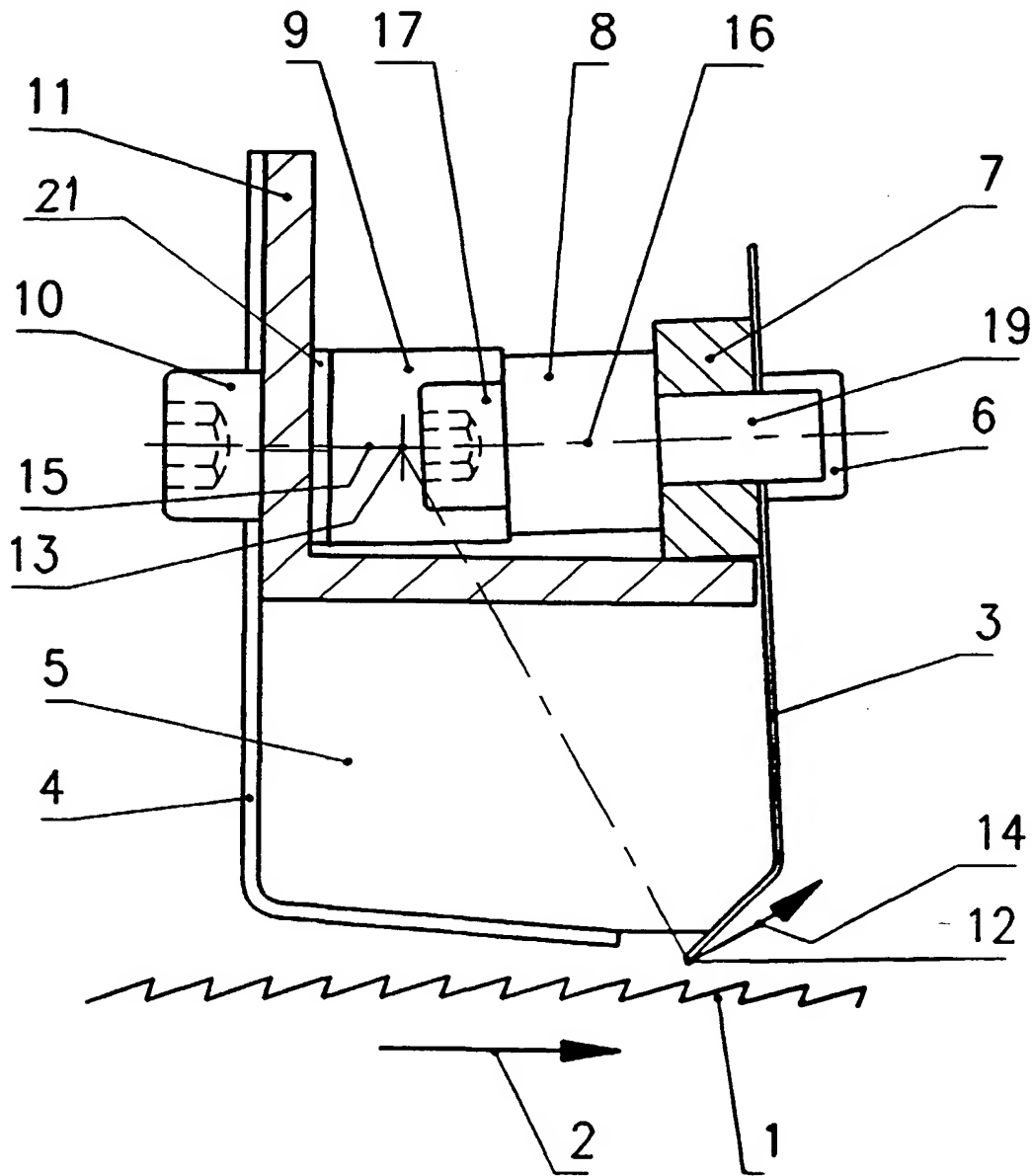


Fig. 1

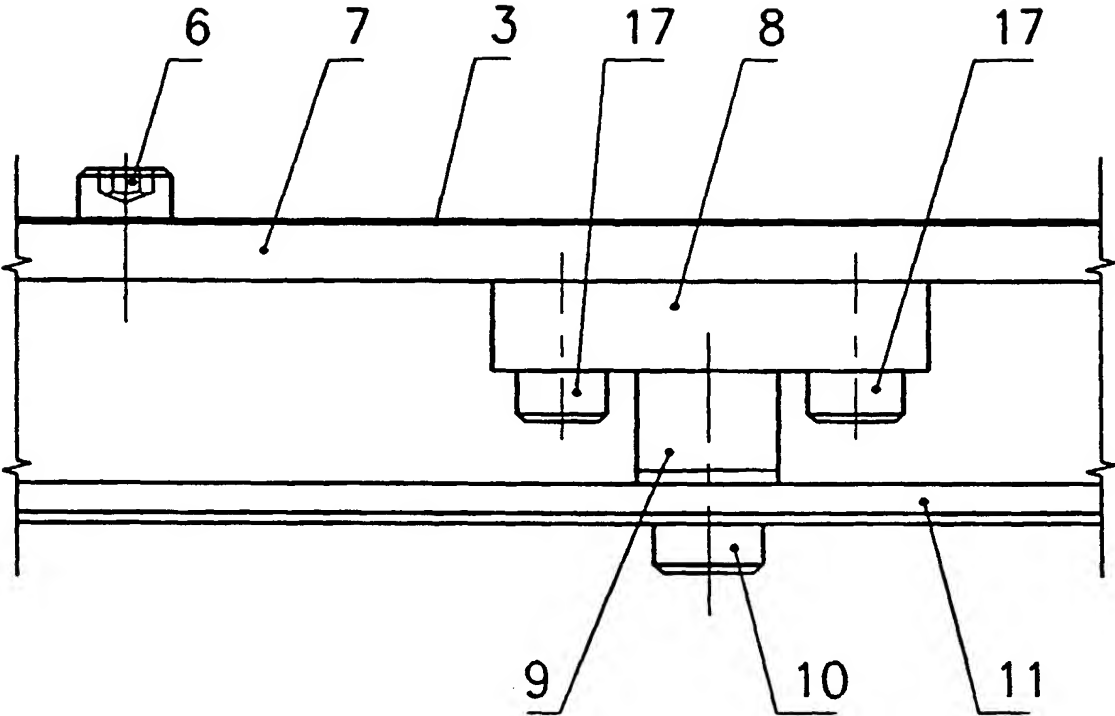


Fig. 2

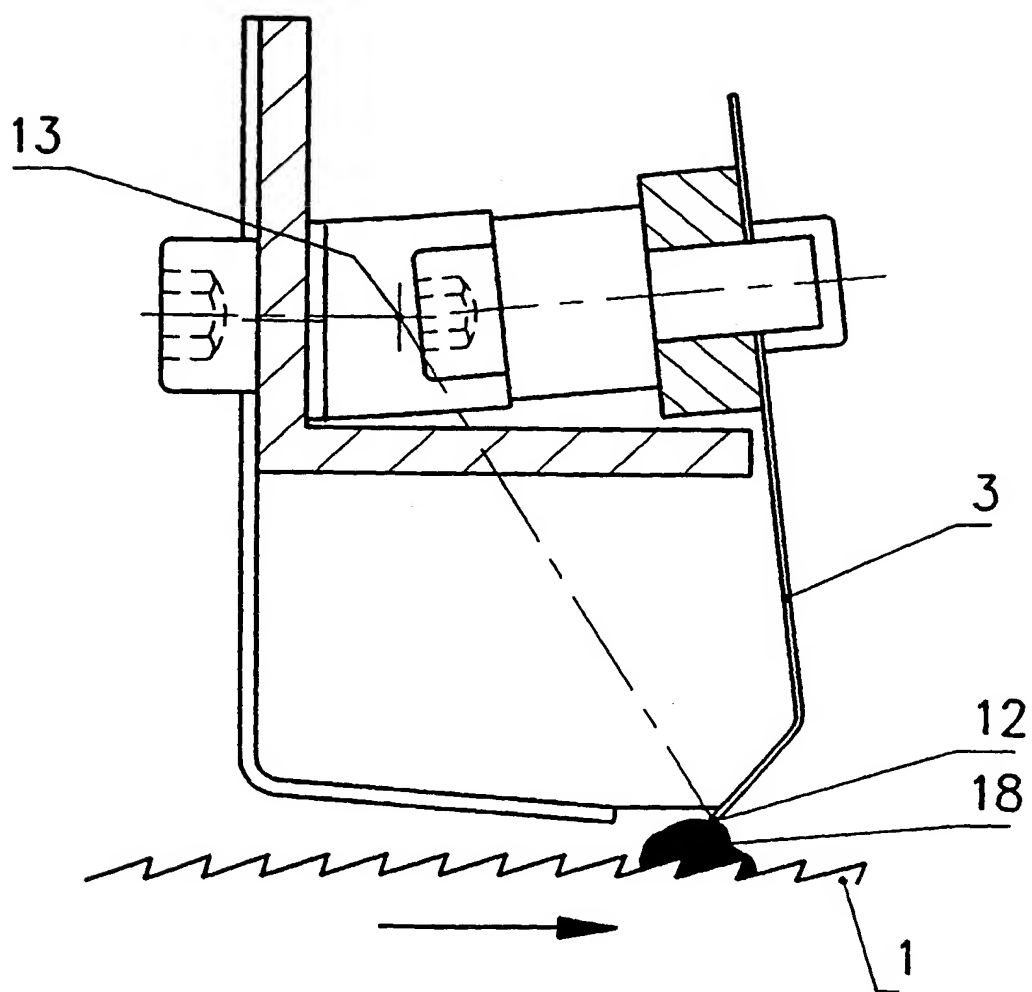


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 99 81 0177

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 August 1999	Examiner Munzer, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 99 81 0177

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-08-1999

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